

# San Francisco Bay Conservation and Development Commission

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February 15, 2017

**TO:** Bay Fill Policies Working Group Committee Members

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**SUBJECT:** **Summary of Bay Fill Working Group Activities and Considerations on Bay Fill Policies and the Built Environment**  
(For Working Group consideration on February 16, 2017)

## Background

In late 2014, the Commission created the Bay Fill Policies Working Group to examine potential policy issues in regards to Bay fill that may be necessary for the region to adapt to rising Bay waters. The Bay Fill Policies Working Group's charge is to make recommendations to the full Commission regarding whether BCDC's law and policies regarding Bay fill need to be amended to adapt to rising sea level and make the Bay region more resilient and environmentally and economically productive, while ensuring Bay protection and maximum feasible public access to the Bay. In developing these recommendations, the Working Group has heard from a variety of stakeholders, regarding the issues raised by potential rising sea level adaptation measures related to Bay fill and the Commission's current laws and policies.

The Working Group developed a work plan for considering the multiple issues and policies that relate to Bay fill. The plan included discussion of the relevant sections of the McAteer-Petris Act and the San Francisco Bay Plan policies, in a series of monthly meetings, separated into two overarching topics – habitat and resource based policies, and those addressing the built environment. The Working Group has completed this review. Commission staff summarized the review of habitat-based projects in a report issued in May 2016, which can be found here: <http://www.bcdc.ca.gov/bayfill/20160519BayFillWGHabitatPolicyRpt.pdf>.

This report summarizes review of fill policies and the built environment that occurred between June 2016 and January 2017. During this period, the Working Group heard from the Policies for a Rising Bay Project, and considered the following topics regarding the built environment: (1) fresh water flow and tidal barriers; (2) projects with adjacent low lying areas; (3) gray to green infrastructure; and (4) regional transportation.

The next step for the Working Group is to host full Commission workshops regarding potential issues associated with Bay Plan Fill policies and adapting to rising sea levels.

## Staff Report

**I. Bay Fill Policies Working Group Meetings.** The Working Group is composed of representatives of the Commission, with Commissioner Barry Nelson (Senate Rules Committee Appointee) as the Chairperson; and Commissioners Jason Brush (USEPA Appointee), Katerina Galacatos (USACE Appointee), Sean Randolph (Governor’s Appointee) and Jim Mc Grath (Water Board Appointee). Staff to the Working Group includes Chief Deputy Director Steve Goldbeck and Brenda Goeden (Sediment Program Manager). The meetings occur on the third Thursday of the month, prior to the corresponding meeting of the full Commission and are open to the public. The meetings have followed a similar format, with each meeting having a selected topic that encompasses an aspect of rising Bay waters and the potential for fill to address the specific issue, often including a presentation from a guest speaker.

As described and summarized below, the Working Group approved and updated a work plan; and met regularly over the past two years. During these meetings, the members examined the Commission’s laws and policies relating to fill for habitat, resource protection, restoration activities, flood protection, infrastructure, and issues associated with the built environment in low lying areas surrounding the Bay. This report covers the past six months of the Bay Fill Working Group’s efforts, focused on issues facing human development. Please see the May 13, 2016 report entitled *“Summary of Bay Fill Working Group Activities and Considerations on Bay Fill Policies and Habitat Based Projects,”* which can be found on the Commission’s website at the link noted above.

The built environment—including the infrastructure necessary to support daily life, as well as commerce and transportation—surrounds San Francisco Bay, and in some cases extends out into the Bay. Many Bay Area communities are located in low lying areas some of which are subject to occasional flooding now, and in many places will be vulnerable to potential inundation in the future as the Bay’s waters rise with the warming climate. Adapting to a future with rising seas may involve fill in San Francisco Bay or its shoreline to protect regional assets. The Working Group members requested that staff provide an inventory of the top fill issues that affect the built environment. From this inventory, the Bay Fill Working Group reviewed related Bay Plan policies and considered the following topics as potential and likely issues that the Commission may have grapple with as communities propose projects to adapt to rising sea levels: (1) fresh water flow and tidal barriers; (2) projects with adjacent low lying areas; (3) gray to green infrastructure; and (4) regional transportation.

**A. Fresh Water Flow and Tidal Barriers.** Roger Leventhal, with the Marin County Public Works, Flood Protection Unit presented the potential benefits and consequences of tidal barriers of differing scales, from large tidal gates such as on the Thames River, London to those installed on local creeks. Mr. Leventhal shared that tide gates, a structure that blocks the high tide, but not the low tide, are often suggested as an easy fix to rising sea level. He provided examples of actual and suggested projects from around the world and locally, of different size tide gates and water control structures. He noted that there are numerous structures currently in use that were not designed for sea level rise. He also discussed how tide gates combined with levee systems could decrease the amount of shoreline protection needed in some areas. He showed several examples of potential flood protection projects in Marin County, with its

many inlets and creeks that would need varying levels of fill and levee systems. He summarized the benefits of tide gates in that a single structure could greatly reduce the length of a barrier/flood wall; they may avoid the private property issues involved in levee/floodwall construction; and can address upstream flooding while nature based infrastructure often does not. He also summarized the potential negative consequences of tide gates as habitat impacts; reduced water quality; impediments to sediment and wildlife passage; degraded appearance; need for storage capacity to contain flow from upstream water sources; gate closure becomes more frequent and for longer periods as sea levels rise over time; pumping of water may be required; high costs; potential gate failure may have disastrous consequences and sets up a moral hazard condition, in that once they are built, they must be continued as people rely on the barrier and as development increases in the hazard zone. He also closed his presentation with a brief note that several European countries that have built barriers are reconsidering them as costs have increased and in some cases function has decreased or not delivered the desired result.

The specific policies addressed included: Fish, Other Aquatic Organisms and Wildlife Policies 1; Water Quality Policies 1 and 2; Surface Area and Volume Policies 1, 2, and 3; Tidal Marsh and Tidal Flats Policies 1, 2, 3, 4 and 5; Fresh Water Flow Policies 1 and 3; Climate Change Policy 1; Safety of Fill Policy 4; and Mitigation Policy 1.

**Questions the Working Group Considered:** Staff prepared the following set of questions for the consideration and facilitate discussion.

1. How would tide gates be tied into adjacent lands, and would they require additional flood protection via walls or levees if not currently in place?
2. Would tide gates cause increased flooding and water retention time on either side of the gate and therefore have adverse impacts? For example, Is there capacity within the stream to accommodate precipitation during storms
3. How would sediment and nutrient flow be impacted by tide gates and how would this affect the upstream and downstream tidal marsh?
4. How would water quality be impacted by tide gates (i.e., temperature, salinity, pollutants, suspended sediment)?
5. As sea level rises, how frequently would the tide gates need to be closed, and how would the structure be adapted overtime increased water levels?

**Discussion and Findings.** While the conversation was curtailed due to attention to other agenda items, the Working Group conversation centered on the issue of applications being reviewed on a project by project basis with little ability or policy basis to take a broader look at how the project fits in to the landscape. The members recognized connectivity as an issue both for the need of flood protection structures to tie into landscape features, and for water, sediment and wildlife exchange. In addition, the members discussed the existence of multiple private homes along creeks and tidal waterways making building or raising levees difficult for a public agency without property rights. The owners of these properties expect the flood protection agencies to manage the inherent flooding issues experienced due to the property's location in the fluvial plain. The members gave some consideration to whether the Commission should develop guidance to local communities and landowners, that could include information about protection options, how they would be evaluated, and why some solutions would be preferred

over others. The members also noted the importance of identifying financing and working with insurance companies on this issue.

**B. Projects With Adjacent Low Lying Areas.** Ms. Lindy Lowe, BCDC Planning Director presented examples of projects that had adjacent low lying areas which would be affected by rising sea levels, from projects recently approved by the Commission and also projects considered as part of Adapting to Rising Tides (ART) assessments. For some of the examples, flooding would originate at the Bay shoreline due to sea level rise, but in other instances, flooding may occur from another location due to low spots in the local topography. For many of these projects, because the areas of future inundation were outside the project footprint, these impacts are not evaluated as part of the permitting process and the Commission currently does not have the ability to address the issue. There were several varieties of projects presented, including those that may lose connectivity due to low lying roadways; those that have minor low spots that could result in inundation of large areas; flooding from upstream sources; and building developments in the middle of the Bay.

The specific policies addressed included: Water Quality Policies 2; Surface Area and Volume Policy 1; Tidal Marsh and Tidal Flats Policy 1; Climate Change Policies 1, 2, 3, 6, and 7; Safety of Fill Policies 2, and 4; Shoreline Protection Policies 1, 3, 4, and 5; Public Access Policies 5 and 6; and Other Uses of the Bay and Shoreline Policies 1 and 3.

**Questions the Working Group Considered:** The following questions were developed for this topic:

1. Would projects that raise elevations within the project footprint create additional flooding hazards to adjacent areas?
2. Are their shoreline protection measures that would reduce potential flooding adjacent areas, including nature-based solutions?
3. What is the best way, prior to developing a regional rising seas adaptation plan, to ensure projects that may create additional flooding to adjacent properties, minimize this potential impact?
4. How should the Commission evaluate projects that would likely become “islands” with rising sea levels due to connectivity issues?
5. Should the Commission consider policies specifically to address adjacent low-lying area flooding and connectivity?

**Discussion and Findings.** The Working Group members discussed the challenges of individual project analysis and the need for a regional plan that would address the more significant issues in a unified manner. They discussed the need to make a distinction between flooding from tributaries and tidal flooding, and recognize that one may compound the other. They noted the need to complete vulnerability assessments for flooding from tributaries given the change in precipitation patterns associated with climate change. This change may require additional flood storage, which could have cumulative effects over time, especially for wildlife. They identified the need for setback levees with a new drainage solution if lower levees along the Bay shoreline allow overtopping during high tides and high Bay water elevations. Additional consideration was given to communities that may be affected by flooding behind levees.

In discussing community level effects, members noted that, similar to the tide gate discussion, private property rights come into play as well as actual impacts verses risk of impacts. Commissioners recognized the requirements of Nollan and Dolan Supreme Court decisions, and that the risk of an impact can't be addressed at this time. Rather, public noticing of the potential risk is important as is being transparent about the process and our understanding of rising sea levels. They considered whether having a recording in the property document might help notice individuals in a more concrete way.

The concept of phased adaptation was also discussed. The Commission might examine how a project may be able to be adapted overtime, such that modest protection might be provided for a shorter period of time and then increased over time, rather than providing full protection at the outset of the project, given the proposed project's lifespan. Concern was also expressed about how to develop economically sustainable public policy, understanding the vast infrastructure and regional assets located along the edges of the Bay.

**C. Gray To Green Infrastructure.** Len Materman, with the San Francisquito Creek Joint Powers Authority (SFCJPA), briefed the Working Group on the general concepts of the SAFER Bay Project. SAFER Bay is a sub-regional approach to protecting multiple adjacent city and county residents and industry from rising Bay waters and downstream flooding, while fostering restoration of healthy ecosystems, and connecting communities by enhancing trail access. Located along the shoreline of Palo Alto, East Palo Alto, San Mateo and part of Mountain View, the strategy makes use of levees behind restored tidal marshes, horizontal levees and other flood management features. Mr. Materman presented the different features of the project, including levees, flood plains, restored marshes, and temporary floodwalls. This project incorporates nature-based solutions, hybrid solutions and traditional "grey" solutions to rising seas.

The specific policies addressed included: the Commission's Scope and Authority; Developing the Bay and Shoreline to the Highest Potential Policy 3; Water Quality Policies 1, 2 and 7; Tidal Marsh and Tidal Flats Policies 1, 2, 3, and 6; Fresh Water Flow Policy 1; Climate Change Policies 1, 2, 3, 4, 5, 6, and 7; Safety of Fill Policies 2 and 4; Shoreline Protection Policies 1, 3, 4 and 5; Recreation Policy 6; Public Access Policies 2, 5, and 6; and Other Uses of Shoreline Policy 1.

**Questions the Working Group Considered:** The Working Group considered the following questions as part of their discussion.

1. Should the Commission consider policies specifically to address large shoreline projects that may affect connectivity between upland areas and the Bay?
2. Would projects such as this limit the marshes ability to transgress as Bay waters rise?
3. How would projects such as this affect the region's ability to provide public access to the Bay and its recreational use?
4. How would a large shoreline protection project affect visual access to the Bay?
5. What are the cumulative effects of projects like these and others along the same shoreline?

**Discussion and Findings.** After the presentation, the Working Group members discussed different aspects of this sub-regional project. They considered whether the Commission could express a preference through its policies or guidance for projects that work with several local

municipalities and stakeholders to develop integrated shoreline solutions and those that use nature bases solutions rather than hardened infrastructure, where appropriate. They also considered how an Adapting to Rising Tides (ART) approach might be helpful. They considered the potential need for guidance on regional projects, green infrastructure, self-mitigation and mitigation banking on a regional basis. There was also concern expressed regarding the potential cumulative impacts of large projects and the ability to maintain and improve the Bay's ecological function and those of its watersheds and creeks. Members recommended that projects such as these should be working with the regulatory and resource agencies from inception rather than coming in as a permit application with limited pre-project coordination. The group also felt that it was important for BCDC to play a stronger role in providing direction to cities and counties about regional approaches. There was also concern that projects should not simply propose self-mitigation, but consider how mitigation can also play a role in regional resilience. The conversation then turned to regional mitigation banks and whether this may be a good approach for both projects and the region. The federal agencies' mitigation banking policies appear to be aligned with this concept. The conversation briefly addressed public access; the group agreed that public access should persist as long as feasible, but then be replaced over time as the Bay waters rise.

**D. Regional Transportation.** Commissioner Dan McElhinney, P.E., the Chief Deputy District Director at the California Department of Transportation (Caltrans) provided an overview of Caltrans work on adaptation including the background, legislative history, vulnerable highways and facilities, current challenges for Caltrans highways and roadways, project development and climate change, adaptive management and sample projects incorporating sea level rise. He also discussed Caltrans policies on sea level rise to identify need, determine feasibility, and conduct ongoing studies of state highways to address the effects of rising sea levels on the region's transportation system. He shared with the members a Caltrans map entitled "Areas at Risk of Inundation Map" prepared by their Sea Level Rise Task Force. He provided specific examples of highways, including 101 in Marin and Highway 37 in both Marin and Sonoma counties that are currently experiencing inundation during king tides and storms, and the planning process Caltrans is undertaking to address these areas.

The specific policies addressed included: Major Conclusions and Policy 4; Tidal Marsh and Tidal Flats Policies 1, and 3; Subtidal Areas Policies 2, 3, and 4; Climate Change Policies 1, 2, 3, 4, 5, 6; Safety of Fill Policy 4; Shoreline Protection Policy 1; Transportation Policies 1, 2, and 3; Appearance, Design, and Scenic Views Policies 4 and 5; and Fills in Accord with the Bay Plan Policy 1.

#### **Questions the Working Group Considered:**

1. The siting of the current highway system in the region provides some level of flood protection to development landward of those highways. Should this relationship be recognized and designed for?
2. Elevating existing roadways may provide additional connectivity of Bay and back Bay habitats. How should the region view this opportunity?
3. The current roadway system may exacerbate fluvial flooding and back Bay flooding. Is it possible to modify the system to reduce these potential effects?

4. Is it possible to realign agency coordination and/or authority to better adapt our regional and local roadway to rising Bay waters?

**Discussion and Findings.** During the presentation the members had several questions regarding how Caltrans considers the added flood benefits its Bay-fronting roadways provide to properties located behind them. Mr. McElhinney responded that Caltrans takes that issue into consideration, but it is not the primary issue that drives decisions, but rather congestion relief and connectivity. He also noted that the Bay Area has some of the most congested freeways in the state. The Working Group also ask specific questions about how sea level rise was being planned for and which metrics were being used. Because the presentation was comprehensive, the group had few questions and discussion was limited. However, the group did note that the current Bay Plan policies on Transportation take a regional perspective that is appropriate for the potential changes that may be necessary with rising Bay waters.

**II. Next Steps for Working Group.** The Working Group has completed its review of conceptual projects that may present policy issues when adapting to rising Bay waters for habitat/resource based and the built environment. The Working Group will revisit over the next few months those conversations that were not completed in order to develop final recommended actions for consideration by the full Commission via public workshops. In several instances the Working Group identified potential solutions to policy and technical issues that arise from rising sea levels. The Working Group will further develop these concepts for additional discussion and consideration by the Commission and staff.

**A. Relationship to the Commission's Sea Level Rise Workshops and Policies for a Rising Bay Project.** In 2016, the Commission held several workshops to explore issues related to rising sea level in a collaborative environment that included Commissioners, their alternates and members of the public. In October, as a result of these workshops, the Commission approved eight recommendations and associated possible actions for the Commission and staff to undertake. As Commissioners, all Working Group members participated in these workshops and assisted in crafting the recommendations and actions. Recommendation 5, "Change existing laws, policies and regulations to more fully consider the local and regional impacts of rising sea levels in permitting and decision-making processes as needed" is specifically in the purview of the Working Group, as this has been its focus since the group's inception. Additionally, Recommendation 4 includes a possible action related to the increase of beneficial use of dredged sediment. This topic has also been a significant focus of the Working Group.

The Commission staff undertook a NOAA project of special merit, entitled, "*Policies for a Rising Bay*" that examined the Commission's policies on fill using four scenario projects. As the project proceeded and was completed, staff briefed the Working Group on findings of the Policies for a Rising Bay Project (Project). Members of the Working Group also participated in this effort. The Project identified policy options for four areas of Commission concern: (1) fill for resilience and adaptation for habitat restoration and projection; (2) fill for resilience and adaptation for innovative shoreline solutions; (3) environmental justice and social equity; and (4) adaptive management plans. Within each of the policy options, the Project identified opportunities for improving Commission tools and practices. Several of the opportunities overlap or compliment the Working Group efforts.

As the Working Group and staff develop the upcoming Bay Fill Commission Workshops, they will incorporate the Commission's adopted recommendation, as well as the relevant findings from the *Policies for A Rising Bay* project.

**B. Commission Bay Fill Workshops.** Beginning in April 2017, the Working Group will share with the Commission and the public what they have learned about the issues the region faces, potential adaptation strategies, challenges the current policies present, and potential options the Commission could pursue to improve its ability to respond to rising Bay waters. The workshops will focus on potential short-term policy and regulations that can be implemented while the longer-term regional strategy is being developed. The three to four workshops will culminate with direction from the Commission to staff on potential Bay Plan amendments, and regulation and legal changes as well as development of guidance documents. Staff will further analyze the issues and provide recommendations to the Commission for consideration through its San Francisco Bay Plan amendment and regulatory change process.